



January 31, 2002
Field Use of IR Conference Call
Notes

Attending: Mary Goldade (EPA), Anni Autio (CDM), Dr. Peter Frasca (EMSL), Rob DeMalo (EMSL), Dr. Scott Slavin (developed eutriator) (EMSL), Mark Raney (Volpe)

Mary Goldade: General Approach for RI Screening:

As EPA works to transition from ER to RI, proposing a method to screen properties in Libby...tools to ID removals versus holdovers for RI, including: analytical methods

That's where the potential for IR comes in...wanted to discuss what EMSL has thought about/developed/worked to investigate this analytical method.

Per Anni Autio...In the middle of a procurement period....can't promise EMSL's ability to perform this work.

Rob Demalo: Describe what you've done to date in use/research of IR on Libby amphiboles.

Work done primarily in soil matrix in lab environment. Goal to push the detection limit.

Questions about viability of IR for use in the Field:

- 1) **Estimated Detection Limit. In lab determined using 0.1% in the lab using W light source calibration. In field, EMSL hasn't done this, but USGS cites 0.05%**

Calibration curve....EMSL worked on this some, but requires additional work to confidently get detections below 0.5%... having trouble to accurately quantify below 0.5%...i.e., getting 0.1%=0.3%... Implies DL $\approx 0.1 \pm 0.2\%$ up to 0.5%....but get positive ND.

- 2) **What matrices have you used it on.....hot soils vs clean/trace level soils?**

USGS interlab Libby soils at/near 1%

- 2) **Potential interferences.**

Moisture. **By far the biggest problem. EMSL dries their soils.**

Do you know what the tolerance is...what amount water/humidity causes a malfunction.

Other minerals. Looked at soil from Libby, nothing in that soil that creates an interference, biotite sorbs at different wavelength. Soil itself does not have interferences. However, this is what most often causes false positive.

Amphiboles.

- 3) Intended for Soil Matrix....but what's the viability for dust analysis?....EMSL has not performed tests on dust samples. At first blush..EMSL intuition suggests that dust is a possibility but would have to work out the following kinks: assume dust will have more organic and would be considerable less dense, would have to prep the sample in a smaller sample ...no interference

A microvac filter would not interfere with IR beam...need a certain amount of mass to achieve sufficient DLs

- 4) Is there a method or description of procedure developed by EMSL available for review?

Rob's email last may...summary of capabilities

have a spectrum of std of chrysotile....fluorotile matrix mixed at a 0.05% level commercial application better detection limit. Will send EPA the spectra...most of the rest is not as current as the notes from this conf. Call (Can control background in commercial because much more homogeneous)

Depends on the fiber size, too....if only one big fiber present among many small...then

- 5) Direct (in situ) versus Mobile lab setting use. Pros & Cons.

Cons.

residential homes– IR moved day to day hard to schedule the homes for.

- 6) What preparation methods/steps required if mobile lab used? Dry remove organics, weigh it and take in to account that mass in overall %age calc., homogenize small petri dish thickness ...thin to penetrate the (2 mm depth)
- 6) Do you have a working instrument available? If not, what do you need to acquire to be able to be viable. (field vs. mobile lab setting)?

USGS/EMSL Method is different. 10-15 minutes analysis time. Sister sites, EMSL found positive, USGS found negative....USGS approach doesn't have the sensitivity. They look at whole sample get an average....signal to noise from far away.

Frasca looks at it from scan...sample close magnification...increase intensity of the light.

Worked on a way to automate to 16 samples. 3 hrs.

Spectra interpretation done at EMSL. When looking at spectra, can it see between cresotile and amphibole...somewhat....fixed the sorption at 1394..won't amosite & anthopholite are above 1400....we miss this unless include another window..... Cresotile frequency ~1392

work out a coordinate system and PLM for verification

USGS

Aperture

Hits it for a couple of seconds.

Notes.

IR guarantees the ND at <0.1%

The smaller the sample vol. implies better sensitivity but longer analysis time can get a false positive....attributed to sorbing polymeric compounds other minerals at same wavelength as Libby amphibole

Con: get a peak don't know if fibrous or not simply from IR. Requires PLM or other confirmatory analysis.